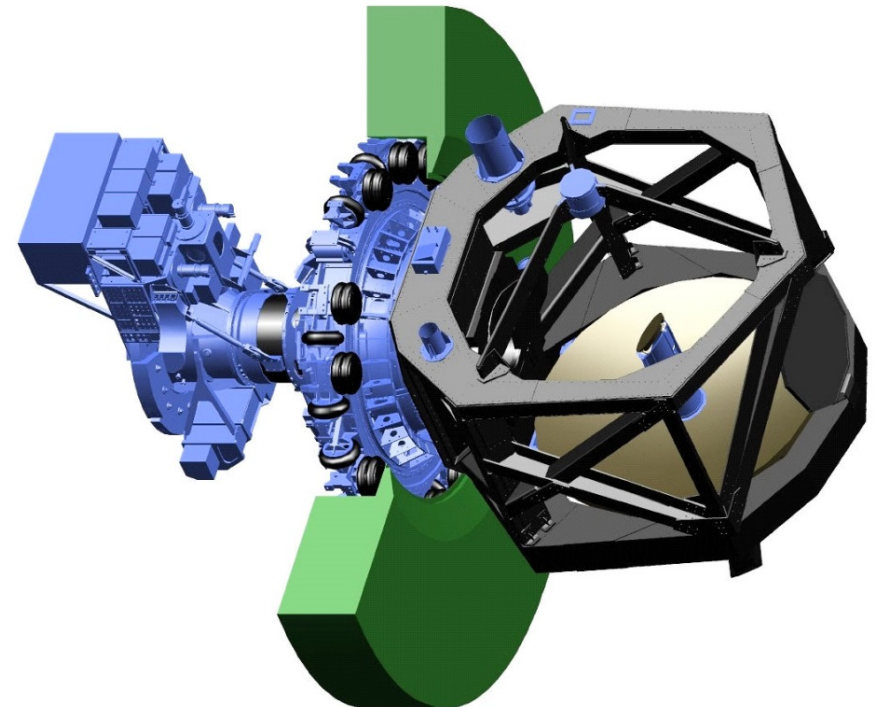


# US-German Cooperation

Heinz Hammes, DLR – German Space Administration



# US-German Cooperation – MOU/JSPP

- Memorandum of Understanding (MoU) between NASA and DLR lays down contributions and utilization of both partners
  - NASA provides the aircraft and it's modification, integrates the telescope and operates the observatory
  - DLR provides the telescope, supports it's integration into the aircraft and contributes 20% to the observatory operations
  - Accordingly, observing time is shared on a 80/20 percent basis between NASA and DLR
- Joint SOFIA Project Plan Phase II „Operations“ (JSPP II)
  - Defines in more detail the tasks between the partners laid out in the MoU



## US-German Cooperation – In General

- NASA/DLR-partnership is very strong. Teams work seamlessly together and relationship between team members is really good.
- Weekly telecons are standard and visits in the US or (as now) in Germany are used to coordinate program needs and necessities.
- Programmatic issues are discussed constructively between the partners. If necessary, even unusual solutions are used.
- Daily work is performed by all program participants in a collaborative manner.



# US-German Cooperation - Operations

- DLR provides 20% of operations by means of:
  - Contract with University of Stuttgart/Deutsches SOFIA Institut (DSI)
    - Appr. 35 personnel in Palmdale (flight operations) and Mountain View (science operations). Astronomers, engineers, mechanics, technicians.
    - University provides additional appr. 10 personnel for Science, EPO and administration
    - Provision of spare parts for the telescope
    - Contracts for maintenance tasks and improvements of the telescope
    - Provision of 4 engines for the aircraft
  - Fuel costs for „German“ flights
  - Mutual support with costs for spare parts, operations, maintenance, repairs



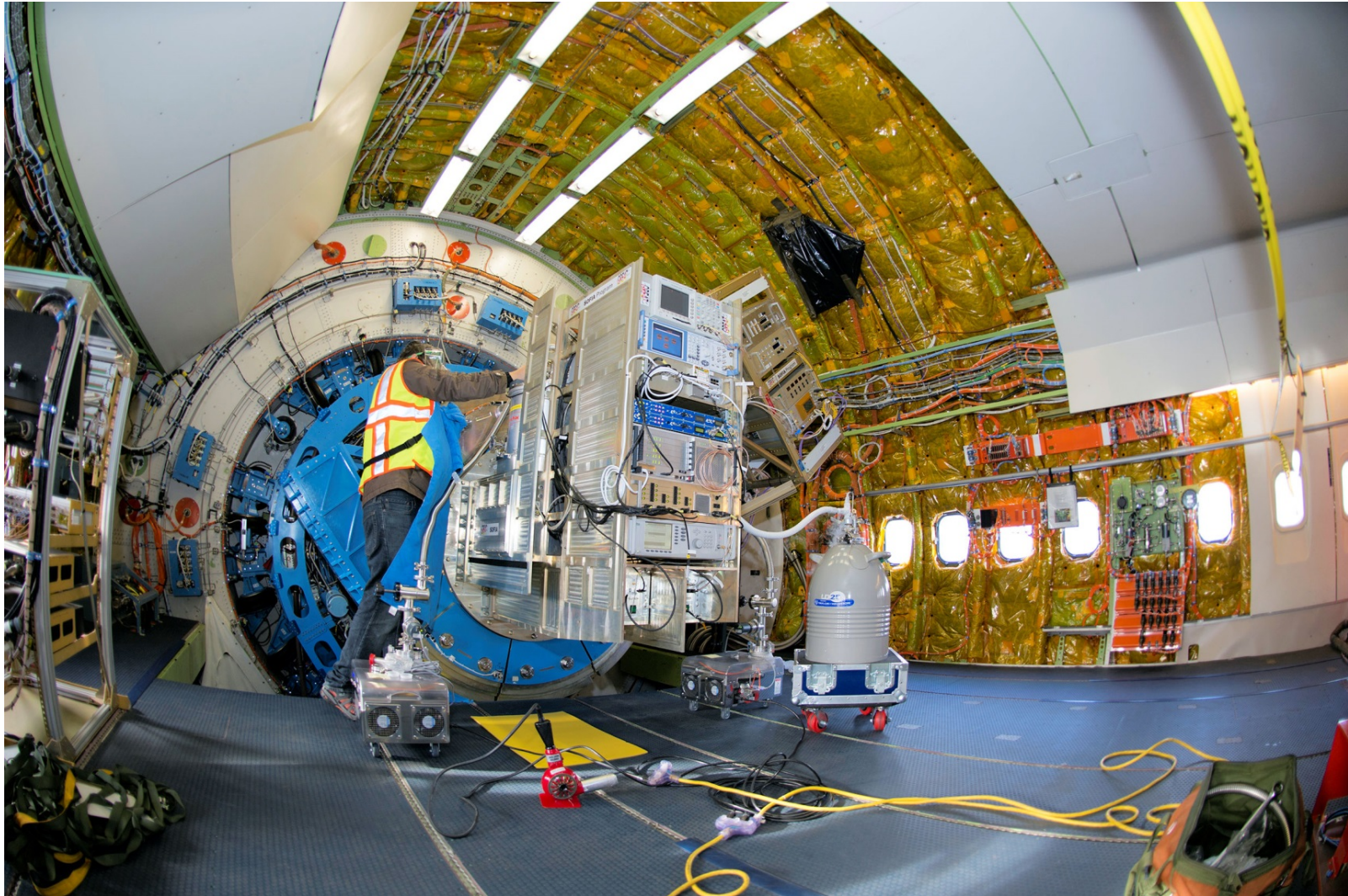
# US-German Cooperation - Instruments

- The Terahertz Heterodyne Receiver GREAT and upgrades to GREAT (upGREAT and 4GREAT)
  - GREAT is operated by the science team as a PI instrument
  - It was developed and built by the MPI for Radioastronomy, the University at Cologne and the DLR Institute for Planetary Research
  - GREAT observes with very high spectroscopic resolution ( $10^7$ ) between 200 and 60  $\mu\text{m}$
  - GREAT has been flown since early 2011, was part of every southern deployment, and is in high demand with about a quarter of all science proposals
  - upGREAT was commissioned with
    - Low Frequency Array (LFA), 2-times 7-pixel array, commissioned in May 2015
    - High Frequency Array (HFA), one 7-pixel array, commissioned in Oct 2016
    - LFA and HFA can also be flown side by side, commissioning of this configuration in May 2017
  - 4GREAT (2 Low Frequency, 1 ) will be commissioned in June 2017





# US-German Cooperation - Instruments



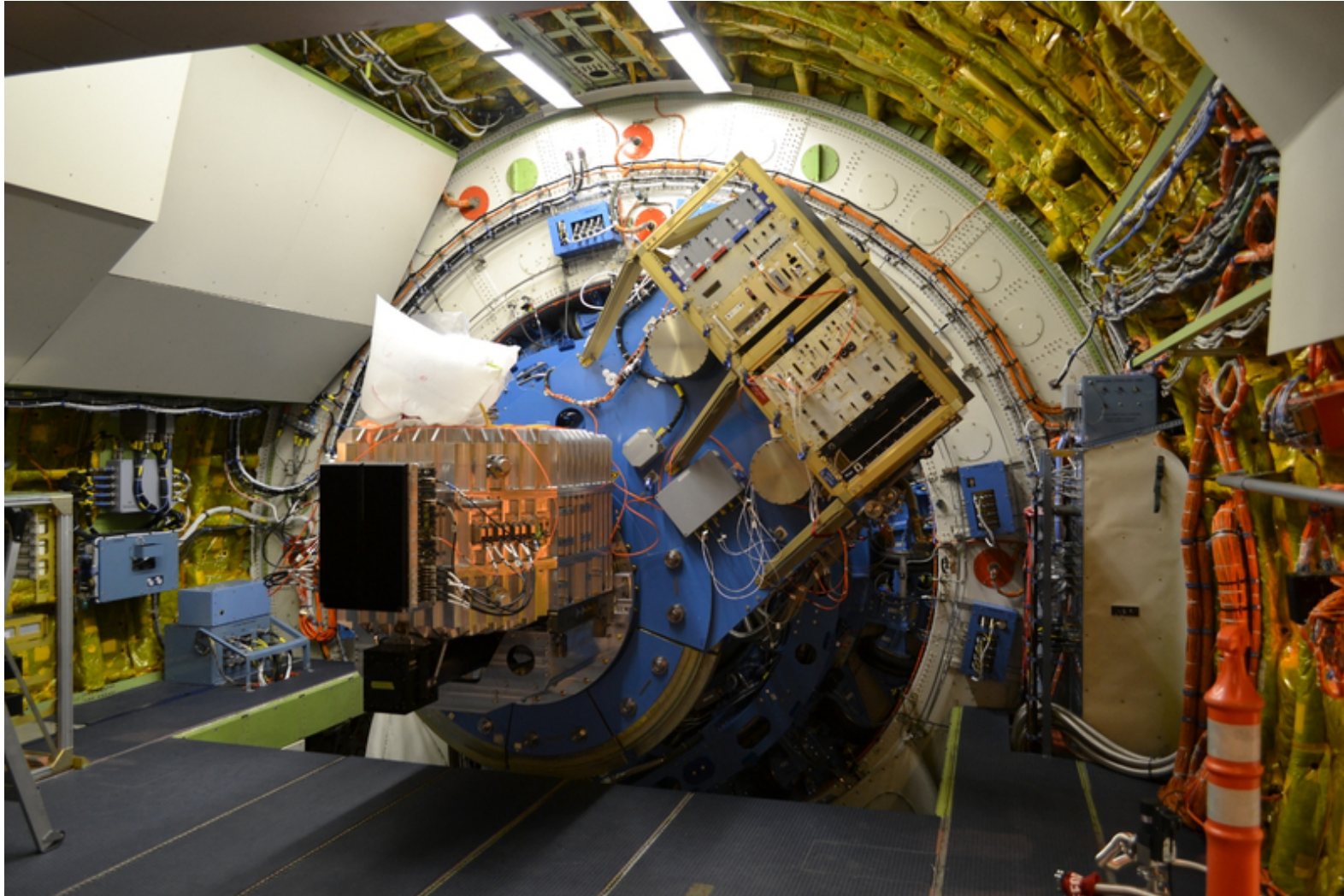
# US-German Cooperation - Instruments

- The Far Infrared Field Imaging Line Spectroscopy Imager FIFI-LS
  - Built by the MPG Institute of Extraterrestrial Research (Garching). Finished and commissioned by the University of Stuttgart
  - FIFI-LS is operated by the science team as a Facility Instrument since Dec. 2015. Continued support for FIFI-LS through DSI
  - FIFI-LS observes in a blue and a red channel covering a wavelength of 42 to 210  $\mu\text{m}$  with medium spectral resolution (2000)
  - Both channels provide 16x25 pixel spatial resolution and 5x5 pixel for spectroscopic resolution
  - FIFI-LS is flying this week in the OC#5 B flight series





# US-German Cooperation - Instruments





Many thanks for your attention

